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ABDOMINAL SECTION FOR TRAUMATISM.

BY

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ABDOMINAL SECTION FOR TRAUMATISM.

By THOMAS S. K. MORTON, M.D.

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THE term "abdominal section for traumatism" is meant to include those cases where the operator deliberately opens the belly, or greatly enlarges an existent wound for the purpose of discovering intraperitoneal wounds, and, if they are present, repairing them as far as possible, together with more or less final cleansing of the peritoneal cavity. Such cases as those in which wounds of prolapsed viscera are simply repaired, and the parts returned to the abdominal cavity, are not included. My excuse for this paper is, that I have been so fortunate as to be associated as an assistant to more than one-half of all the cases that have occurred in Philadelphia. In four of the cases I have been the assistant, and in three the care-taker also. These four cases have been treated in the Pennsylvania Hospital. I had at first expected to read merely the history of these cases, and make a few remarks, but the matter grew so interesting that I determined to make a study of the subject, and I believe that I have canvassed the literature of the world. I must express great obligations to the gentlemen who permit me to report their cases for the first time to-night, and to Dr. Billings, of Washington, who had translated for me the reports of two Russian cases. I have used the libraries of the College of Physicians and Pennsylvania Hospital, and have found the *Index Medicus* of great service. I have prepared these large tables, which contain a mine of information. They represent an abstract of every case which I have been able to find in the literature of the subject.

I shall, in the first place, read a few statistics derived from the tables. The total number of cases is 57. Of these, 36 died, and 21 recovered: mortality, 63 per cent.

These 57 cases were done by 42 operators, viz., 23 United States operators did 35 operations, with 11 recoveries, and 24 deaths: mortality, 67 per cent.

TABLE I.—GUNSHOT WOUNDS.

Operator and reference.	Age	Time after injury.	Special symptoms.	Intra-peritoneal injuries, etc., found.	Treatment of intra-peritoneal injuries.	Result.	Remarks and post-mortem.
A. R. KIRKLOC. North Car. Med. Journ., 1882, x, i.	Adult	11 hours.	Slight shock; general abdominal pain; pain in sacral region; hole in rectum.	Much blood and feces; 5 perforations of intestine, 2 of mesentery; rectal wound could not be found.	Trimmed, and sutured with Lembert's stitch; drain.	Died in 16 hrs.	Post-mortem: another intestine wound found.
Kocher. Correspond. für Aertze, 1883, No. 23.	14	3 hours.	Collapse; signs of peritonitis.	Much blood; wound of large curvature and fundus of stomach $1\frac{1}{2}$ in.	Sutured.	Recovered.	
JORDAN LLOYD. Brit. Med. Journ., 1883, i, 560.	19 F.	48 hours.	Little shock; no vomiting; later constant vomiting and peritonitis.	Much stinking brown fluid; ragged wound of small intestine $\frac{3}{4}$ inch in diameter	Intestine stitched to wound.	Died in $\frac{1}{2}$ hr.	Post-mortem: mesentery perforated; contusion of bladder.
W. WATKINS SEYMOUR. N. Y. Med. Journ., 1886, xlv, 209.	15	13 hours.	No shock at any time; vomited; some pain down left setatic nerve.	Acute peritonitis; 3 lines of colon destroyed; 2 wounds of meso-colon; thickened duodenum.	All approximated with Lembert sutures.	Died in 21 hrs.	Post-mortem: wounds in good condition; no others found.
C. A. JENSEN. Med. Record, Oct. 16, 1886.	44	20 hours.	Much shocked; pain and tenderness of abdomen.	4 wounds of small intestine; 2 perforations of mesentery	All wounds, except the abdominal, stitched with Lembert's sutures.	Died in 19 hrs.	Post-mortem: mesenteric wounds; sloughing, and bathed with pus.
T. ANNANDALE. Lancet, 1885, i, 740	15	1 hour	General shock; slight pain in abdomen and pelvis.	Considerable blood; 5 wounds of small intestine, 2 in colon, 2 in rectum; wound of mesentery.	All closed with Lembert's sutures.	Died in 24 hrs.	Walked 100 yards after injury. Post-mortem: wounds firm; no others found
F. S. DENNIS. Med. News, 1886, xlviii, 225-253.	23	...	Great shock.	Much blood; wound of liver and its great vessels.	None; abdomen rapidly closed.	Died in 48 hrs.	
F S. DENNIS. Ibid.	26 F.	...	.....	Much blood; 7 wounds of intestine, and 1 of mesentery; uncontrollable hemorrhage from iliac veins.	Wounds sutured.	Died in 48 hrs.	Post-mortem: abdominal cavity filled with blood.
A. V. PARK. Chicago Med. Journ. and Examiner, 1885, li, 412.	16	22 hours.	Abdomen tympanitic; no liver dulness.	Great quantity of blood; $\frac{1}{2}$ in wound, also groove in small intestine.	Lembert sutures to groove and perforation.	Died in 15 hrs.	Post-mortem: few clots; peritonitis; contused wound of rectum.
Wm. T. BULL. Med. News, 1885, i, 171.	22	17 hours.	Vomiting; pain; tenesmus; involuntary micturition.	5 wounds of small intestine; 1 wound of sigmoid flexure.	Lembert sutures to all.	Recovered.	Ball found among intestines.
E & W. E. ANDREWS. Journ. Am. Med. As., 1885, p. 177.	Adult	...	Vomited much blood; diffusely tenderness of abdomen.	Considerable bloody serum only.	.....	Recovered.	
J. B. HAMILTON. Journ. Am. Med. As., 1885, li, 202.	19	...	.....	11 wounds of small intestine; 2 of colon; omentum and mesentery wounded.	Lembert suture to intestine; wounds ligatured, and removal of injured portion of omentum.	Recovered.	Pelvic suppurating; hematocele evacuated through rectum on twelfth day.

TABLE I.—GUNSHOT WOUNDS (*continued*).

Operator and reference.	Age.	Time after injury.	Special symptoms.	Intra-peritoneal injuries, etc., found.	Treatment of intra-peritoneal injuries.	Result.	Remarks and post-mortem.
T. G. RICHARDSON. N. O. Med. and Surg. Jour. 1886, xlii. 867.	Adult	9 hours.	Great shock; vomiting; signs of incipient peritonitis.	3 tears of intestine; 1 of mesentery.	All sutured.	Died in 14 hrs.	
A. C. L. RANSAY. Northwestern Lancet, 1885, iv. 377.	7	6 hours.	Great pain; much vomiting.	Much blood; extensive wound of duodenum; contusion of colon.	Excision of gut including wound; Lembert sutures.	Died in 1 hr.	
Wm. T. BULL. Med. News, 1886, xlix. 601.	24	6 hours.	Severe abdominal pain; shock; vomiting; diminished liver dullness; fluid in abdominal cavity.	2 wounds of small intestine; 2 of transverse colon; extravasation into meso-colon.	All sutured by Lembert's method.	Died in 8 hrs.	Post-mortem: nothing more than above.
Wm. T. BULL. Med. News, 1886, xlix. 524.	57	12½ hours.	Shock; vomiting; scarce any pain.	Great amount of blood; left lobe of liver almost divided.	None; abdomen closed.	Died on table.	Post-mortem: no other wounds found.
Wm. T. BULL. Med. News, 1886, xlix. 524.	25	2½ hours.	Nausea; abdomen appeared normal; only vicinity of wound tender.	2 wounds of small intestine; 3 tears of peritoneum of meso-colon; omentum and anterior epiploic appendages torn and bleeding.	Lembert sutures to intestinal wounds; omentum and appendix excised.	Recovered.	
ABBE. Med. News, 1886, xlix. 521.	53	3½ hours.	Slight shock; vomiting; rapid and increasing abdominal pain; tympany.	4 wounds of small intestine; wound between bladder and rectum. Much sub-peritoneal extravasation.	All approximated with Lembert's suture.	Died in 9 hrs.	Walked two squares after injury. Post-mortem: purulent peritonitis; ball found in bladder.
F. J. LUTZ. Weekly Med. Rev., 1886, 514.	21	...	Right side of abdomen tympanitic; left side dull.	7 wounds of small intestine, 4 wounds of mesentery.	Lembert's suture; ligature to mesenteric artery.	Died in 3 days.	Post-mortem: purulent peritonitis; wounds in good condition.
MACELLAR. Lancet, 1887, i. 37.	23	30 hours.	Some shock; no evidence of wound of bowel; next day peritonitis.	2 wounds of lower portion of sigmoid flexure.	Wounds could only be ligated.	Died in a few hours.	Post-mortem: no other wounds; bullet between rectum and bladder.
C. B. NANCY. Phila. Acad. of Surg., 1886.	...	...	At first little pain or shock, later copious bloody vomiting.	Perforation of anterior and posterior wall of stomach; two large perforations of duodenum.	Lembert sutures; "cleansing."	Died in 3 days.	No post-mortem.
T. G. MORTON. Unreported.	36	1½ hours.	Some pain; no shock; vomited blood copiously.	4 wounds of stomach; 1 of transverse colon; omentum much lacerated.	Lembert sutures to all.	Died in 6 hrs.	Post-mortem: wounds and abdomen all right; large hemorrhage (1½ pints) into left pleura from cut intercostal artery.

TABLE II.—STAB WOUNDS, INCLUDING ONE BY SPLINTER OF WOOD.

Operator and reference.	Age.	Time after injury.	Special symptoms.	Intraperitoneal lesions found.	Treatment of intraperitoneal wounds.	Result.	Remarks and post-mortem.
G. TRINGE. St. Pgb. Med. Wech., 1884, No. 24.	19	Soon.	Vomited much blood.				
W. O. ROBERTS, Am. Pract., 1884, xxix. 13.	44	A few hours.	Considerable hemorrhage from wound.	Much blood; 1½ in. wound of gut; curvature of stomach; 2 wounds of small intestine; 2 of mesentery.	Lembert sutures.	Recovered.	
BARKER. Lancet, 1886, i. 347.	Adult F.	3½ hours.	.....	Incised wound of omentum.	All sutured.	Recovered.	
J. B. ROBERTS. Polyclinic, 1886, iii. 93.	19	2 hours.	Great shock; vomiting; violent pain	2 wounds of small intestine.	None.	Recovered.	
F. S. DENNIS. Med. News, 1886, xlviii. 225-253.	22	...	.....	2 incised wounds of small intestine—1 cut serous and muscular coats of intestine. None found.	Lembert sutures.	Died in 2 days.	Post-mortem: purulent peritonitis; one wound overlooked.
F. S. DENNIS. Med. News, 1886, xlviii. 225-253.	57	3 hours.	.....	2 large wounds of small intestine.	Czerny-Lembert sutures.	Recovered.	
F. S. DENNIS. Med. News, 1886, xlviii. 225-253.	25	Next day.	Had been stabbed in hernia; hernia reduced; peritonitic symptoms next day.	None found.	None.	Recovered.	
F. S. DENNIS. Med. News, 1886, xlviii. 225-253.	22	...	Considerable hemorrhage from external wound.	2 large wounds of small intestine.	Resection of gut, including wounds.	Died in a few hours.	Post-mortem: resection all right; no other wounds.
J. McF. GASTON. Med. and Surg. Rep., 1886, liv. 739.	30	4 days.	Much shock; afterward acute peritonitis.	5 wounds of small intestine.	Czerny-Lembert sutures.	Died in 40 hrs.	Post-mortem: wounds in good condition; no other wounds.
J. G. BROOKS. Med. Herald, 1886, viii. 134.	11	A few hours.	Great shock; abdomen tense and dull.	Brush burn of colon.	None.	Shortly recovered.	
W. S. TREMAINE. Med. News, 1886, xlix. 601.	18	10 hours.	Opium poisoning also; free bleeding from wound.	Great quantity of blood; cut and bleeding mesentery.	Vessels ligated.	Died.	Admitted with opium poisoning, from which he died.
J. B. ROBERTS. Unpublished.	40	¾ hour.	Violent abdominal pain; prolapse small knuckle intestine; free hemorrhage.	4 wounds of small intestine; 1 of colon; mesentery transected.	None.	Recovered.	
KWIECINSKI. Pregl. Hk. Krakow, 1885, xxiv. 71.	20	At once.	Great pain; vomiting.	3 wounds of small intestine.	All closed with Lembert sutures.	Recovered.	
G. GUARICO. Genova, 1886. Due casi di enter ferite di intestine.	30	...	.....	Wounds of intestines.	Sewed.	Recovered.	
G. GUARICO. Genova, 1886. Due casi di enter. fer ferite di intestine.	30 F.	...	.....	Wounds of intestines.	Lembert sutures.	Recovered.	
WUNDERLICH. N. Y. Med. Journ., 1887, i. 68.	19	6 hours.	.....	Wounds of intestines.	Lembert sutures.	Recovered.	
J. B. DEAYER. Unpublished.	Adult	...	Much blood in peritoneal cavity; great shock.	¾ in wound of gut—anterior curvature of stomach. Wound of spleen.	Lembert sutures. Excision of spleen.	Died in 1 hour.	Post-mortem: wound in good condition.
T. G. MORTON. Unpublished.	30	9 hours.	Increasing pain about wound; also emphysema; no shock.	Wound of omentum, 1½ inch.	Suture of omentum; ligature of bleeding omental artery.	Died.	Post-mortem: wound of kidney, etc.
J. AVERY. Med. Age, 1885, iii. 412.	Adult	7 hours.	Much shock.	2 wounds of small intestine, 1 of mesentery.	Wounds trimmed, and Glover's sutures introduced.	Recovered.	

Operator and reference.	Age.	Time elap. after injury	Special symptoms.	Intra-peritoneal lesions	Treatment of Intra-peri- toneal lesions.	Result.	Remarks and post- mortem.
WALTERS.							
Wm. T. BULL. An. of Surgery, 1885, 1 67.	22	10 hours.	Signs of active peritonitis.	Much blood and urine; extensive tear at base of bladder.	Removal of foreign con- tents. Drainage tube.	Recov- ered.	Catheter in bladder also.
Jos. M. Fox. Unpublished.	46	13 hours.	Great shock; bloody urine; dulness half way to umbilicus; catheter went be- yond bladder.	3¼ inches rent of posterior wall of bladder.	7 Lembert sutures.	Died in 7 hrs.	Also had fractured pel- vis.
J. DREXAN. Lancet, 1886, ii. 399.	38	19 hours.	Great pain about bladder, and desire to micturate; bloody urine; great shock	Much blood and urine; 2½ inch tri- angular rent in anterior wall of bladder.	15 Lembert sutures; soft catheter in urethra.	Died in 42 hrs.	No abdominal drain. Post-mortem: bladder wound firm.
Wm. MAC CORMAC. Lancet, 1886, ii. 1118	37	22 hours.	Shock; desire to urinate, but no power; bloody urine; peritonitis; vomiting.	Blood and urine; 2½ in. rupture of posterior bladder wall.	Glass drain sutured into bladder wound.	Died in 55 hrs.	Urine passed voluntarily from first.
MCGILL. Lancet, 1886, xxi. 972.	...	27 hours 3 days.	Fluid present in abdomen; signs incipi- ent peritonitis; nausea.	Large amount of bloody fluid; 3 in. rent upper portion of bladder wall.	12 Lembert sutures.	Recov- ered.	Post-mortem: bladder wound firm.
C. HEATH. Brit. Med. Journal.	40	40 hours.	Inseparable for time; pain; bloody urine; could not urinate, though had desire; incipient peritonitis.	Pint of urine; 4 in. rent of apex and fundus of bladder.	11 sutures.	Died in 17 hrs.	
HORNELL. Brit. Med. Journ., 1883, i. 560.	Adult	...	Tense belly; bloody urine by catheter; injected water felt through abdomen by patient.	Rent of bladder.	Continuous suture.	Died in 6 dys.	Post-mortem: suture had given way.
MAC CORMAC. Lancet, 1886, ii. 1118.	Adult	19 hours.	Principally those of extra-peritoneal rupture	Intra- and extra-peritoneal rupture of bladder; great infiltration of tis- sues with blood.	Partial suture; upper portion left open, and drained.	Recov- ered.	
A. WILLETT. St. Barth Hosp. Rep., 1876, 209.	33	...	95 oz blood-tinged urine drawn. Had walked mile to hospital day after injury	4 inches median vertical rent of blad- der.	16 Lembert sutures; peritonitis; at sides divided to relax blad- der walls.	Recov- ered.	
	48	29 hours.	Shock and pain; bloody urine by cath- eter later; symptom of peritonitis.	3½ inches rent across fundus of blad- der.	Interrupted sutures.	Died in 23 hrs.	Post-mortem: portion of wound found open.

TABLE IV.—RUPTURED AND CONTUSED INTESTINE.

BOULLY Bull. et Mem. Soc de Chir, 1883, 630.	29	23 hours.	Signs of incipient peritonitis; fecal vomiting.	3-inch rupture of small intestine; also gangrenous bruise of intestine above rupture.	Resection 5 inches small intestine.	Died in 10 dys.	Post-mortem: gangren- ous portion had given way after manipulation
CHEVASSE Ib., 1885, 123.	23	...	Shock at first, then peritonitis	Colon badly contused in two places; Intestine and meso-colon infiltrated with blood.	None.	Died in 6 dys.	
E. A. WAGONER. St. Louis Cour. of Med., 1886, xvi. 204.	8	27 hours.	Walked 400 yards; great shock followed by violent peritonitis.	Rupture of intestine 2½ feet above ileo-caecal valve; much feces.	Sutured.	Died in 2 hrs.	
T M GRUNDKROCK. Australia Medical Journ., 1883.	22	4th day.	Shock, which was followed by develop- ment of peritonitis; vomiting.	Almost complete rupture of ileum; tears of omentum.	Excision of wounded bowel.	Died in 1½ hr.	
FITZGERALD. Ibid., 1883, 204.	58	20 hours.	All signs of double strangulated hernia. (His truss had been pressed violently against descended hernia.)	Ruptured small intestine.	Sutured.	Died in 8 hrs.	

9 English operators did 10 cases, of which 3 recovered, and 7 died: mortality, 70 per cent.

2 Australian operators did 2 operations, with 2 deaths.

2 French operators did 2 operations, with 2 deaths.

2 Russian operators did 2 operations, with 2 recoveries.

1 German and 1 Swiss, each did an operation, with success.

1 Italian operator did 2 operations, with 2 recoveries.

7 operations have been done in Philadelphia by 5 operators, with 2 recoveries and 5 deaths. 5 of these have been performed at the Pennsylvania Hospital by 3 operators, with 2 recoveries, and 3 deaths.

Of the 57 tabulated cases, 38 per cent. were for pistol- or rifle-shot wounds; 35 per cent. for stabs; 17 per cent. for ruptured bladder, and 10 per cent. for ruptured intestine.

Operations were done according to years as follows: 1862, one; 1876, one; 1879, one; 1882, one; 1883, seven; 1884, five; 1885, thirteen; 1886, twenty-nine.

In every case which died after operation, lesions certain to cause death, if uninterfered with, were found. One case of penetrating wound was opened, in which no visceral injury was found; it recovered.

The first case of abdominal section for traumatism was that of Walters', of Pittsburg, for ruptured bladder, in 1862. The first successful case was the same. The first case after Walters' was that of Heath, in 1876. The first recovery after Walters' case was that of Dr. W. O. Roberts, done for stab wound, August 28, 1882.

The sex was reported in 56 cases: males 52, of this number 33 died, and 19 recovered. There were 4 females, of which number 2 died, and 2 recovered. 4 were negroes, all males; 1 recovered, and 3 died.

The age was reported in 46 cases, the oldest being 58 years, and the youngest 7 years. The ages ranged as follows:

1 each 7 and 8 years old; both died.

11 between 10 and 20 years; 4 recovered, and 7 died.

15 between 20 and 30 years; 5 recovered, and 10 died.

9 between 30 and 40 years; 5 recovered, and 4 died.

1 each 53 and 58 years; both died.

2 57 years; 1 recovered, and 1 died.

The indications for abdominal section for traumatism are in many cases very clear; in others, with only our present knowledge, exceedingly obscure. Taking up the consideration first of wounds, it seems to me that, with what we already know, the operation is clearly indi-

ected in every case where penetration of the abdominal cavity is proven, and with fair surroundings it becomes one's duty to open the abdomen and search for wounds, for there are no omnipresent symptoms which invariably indicate intraperitoneal wounds, even when extensive. With reference to the cases suitable for operation, I would say that, besides gunshot wounds, stabs, etc., which have already been operated upon, I conceive that in the future many other traumatic conditions will be subject to interference by section, such as rupture of the stomach, gall-bladder, spleen, or kidney, ruptured bloodvessels, various hæmatocèles, etc. Dennis, of New York, had a case in which he opened a penetrating stab wound of the abdomen. He found, besides the injuries, an intussusception evidently caused by the violent peristalsis excited by the point of the knife touching the intestine, and I therefore conceive the possibility of intussusception without wounds. In this paper, no consideration is paid to the effects of traumatism upon diseased organs, such as ulcerated stomach or bowels, or upon the pregnant uterus or its diseased appendages, or perforating typhoid ulcers.

I shall consider the subject of diagnosis as a whole, with the exception of that of ruptured bladder which I shall take up later. The diagnosis of penetrating wounds of the abdomen is occasionally very easy—occasionally exceedingly difficult. Where there is a pistol-shot wound of the anterior wall of the abdomen and a probe can be inserted, or where there is extravasation of feces, the diagnosis is easy enough. Emphysema is given as one of the best symptoms of perforation of the intestine. I regard it as a poor one. One of the cases occurring in the Pennsylvania Hospital presented marked emphysema of the abdominal walls without injury to the lung or intestine. Injury of the lung may give rise to emphysema, which may be mistaken for that due to a wound of the intestine. Diminution of the liver dulness due to the escape of flatus into the abdominal cavity is another symptom, but this is fallacious. Shock is usually marked, but in some cases the patient is not at all shocked. Instances are on record where patients have walked long distances, and yet, on opening the abdomen, wounds of the intestines have been found. One man did not even know that he was shot until he had walked some distance to his home—yet he had numerous intestinal perforations. Of course, vomiting of blood and the passage of bloody stools are good signs, but they are not always reliable. The symptomatology of penetrating wounds of the abdomen is very obscure and we should like to have some light thrown upon it. Of course, a

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wound through the back is more difficult to diagnose than one from the front, and frequently the diagnosis can only be made by incision. Even where the ball is found lying under the skin, you cannot be sure, for it may have passed around the abdomen. The most interesting class of cases is that in which there has been a blow or injury upon the abdomen and we suspect rupture of the intestine, the spleen, liver, or bloodvessels. These are most difficult cases to diagnose, and I predict that in the future we shall open many abdomens in order to determine whether or not these conditions are present.

In regard to the surroundings under which one should operate. In a metropolitan hospital surrounded by every convenience, I think that the majority of cases should be operated upon. In cases where injury to the gut is known to have occurred, and in many cases where it is suspected, it is our duty to operate. In the country and in unskilled hands only those cases which are the most desperate should be operated upon, unless they can be removed to some centre.

If the patient appears to be coming out of shock, he should be allowed to do so as far as possible. Shock from hemorrhage is, of course, the worst. Where there is extravasation, the shock will be kept up, and under such circumstances etherization and removal of the cause would be the best way to overcome it. The preparation of the patient should be by judicious treatment and thorough cleansing. I shall not to-night go into the subject of antisepsis or asepsis, although I hold positive views of their great value. Everything should, however, be surgically clean.

Where there is a wound of the anterior wall of the abdomen, first prove perforation by cutting down to the peritoneum. That should be a sufficient warrant for section. In wounds of the back some judgment must be exercised. The incision should, I think, in almost every case be median. In the majority of the cases recorded in the table, and, I think, in nearly all the successful cases, the incision was median. In several instances where section has been done for a special purpose, such as removing an injured spleen, the incision has been made on one side of the median line. In one case of stab wound which I saw, the original wound was enlarged and gave rise to great difficulty in the subsequent steps of the operation. One wound was overlooked in that case, which error, I think, was largely due to the position of the incision. The length of the abdominal wound is to be governed by the circumstances of the case. It may extend from below the ensiform cartilage to the pubes. There is no harm in a long wound if it be properly treated. After opening the peritoneum, note carefully the

abdominal contents. If we find feces, we are encouraged to prolong the search until the wound is found. If there is blood, we should look for the vessel injured. The search for wounds should be thorough and systematic. In most of the cases where wounds have been overlooked, it has resulted from not making a systematic examination. We should begin at the entrance of the œsophagus into the stomach, if it is possible to reach so high, go over the stomach and all the intestines, examine the mesentery, the rectum, and bladder, and look at the spleen. Unless this is done, wounds will sometimes be overlooked, and even with the utmost precaution they will sometimes escape detection. Only those who have seen these cases can imagine the difficulty experienced in finding such wounds, especially when the upper part of the transverse colon and the surrounding omentum are involved. If the intestines are much distended, it may be necessary to puncture them. It is important to remember that extravasation has followed such a puncture, and they should always be closed with a Lembert suture. If the vermiform appendix or an epiploic appendage is injured, it should be excised. In wounds of the intestine, it makes a difference whether the injury is the result of a gunshot or of a stab. Gunshot wounds are more apt to slough than knife wounds, and where many of the former are located close together, it has been found advisable to excise a portion of the gut including the numerous lesions. Probably a foot of the bowel may be excised without much disadvantage. Six or eight feet have been excised, but in this case the operation was followed by emaciation and death. In such a case it would probably be better to make several excisions. Perforations when found should be turned into the bowel by the suture of Lembert. Wounds of the large intestine and stomach are to be treated in the same way.

Where the ball has perforated the mesentery, the wound edges should be excised. This is the opinion of those who have done most operations. The opening is then brought together with stitches on both sides, or passing entirely through. If the omentum be badly injured, no harm will come from its excision. It may be ligated in various places and the whole cut off without injury. In a hernia case, I cut off what I supposed to be almost the whole omentum, and the man recovered perfectly. Where the spleen is wounded, the only method seems to be to excise the organ. This has been done, so far as I know, twice. Very little is known about the treatment of injuries of the spleen. Wounds of the liver have been met with a number of times and all the cases have died. Whether or not it would be

practicable in these cases to stitch the liver to the abdominal wall, etc., I cannot say. Tait has done it in chronic disorders a number of times and has had favorable results. We should be encouraged to experiment in this direction. About wounds of the pancreas little is known—I doubt if they could well be reached. If the kidney is extensively wounded, its excision or complete drainage is indicated. If the ureter is divided, the only remedy is excision of the corresponding kidney. If the projectile has gone through the diaphragm, the same operation as in the case of the mesentery would be indicated, namely, excision of the edges and sutures. Of course, all bleeding vessels are to be tied. If this is impossible, the main trunk, even if this be the aorta, must be tied. Wounds of the uterus and appendages have not been dealt with, but would probably require excision.

Then there is another class of wounds entering the abdomen—that is, wounds through the vagina and rectum; for instance, a stab wound through the vagina. If we knew that it penetrated, abdominal section would be indicated. In all these cases contusions or brush burns of the omentum and intestine frequently are found. In time, nearly all of these will slough and give rise to pus. In several cases death has been attributed to this cause. All severe contusions involving the mesentery or omentum should be excised. When they involve the intestine, the peritoneum should be united over them with Lembert sutures. The suture materials which I have seen used have been silk and catgut. I think the latter is preferable if fine and chromicized.

I have here one table which gives the average time after injury when the operation was performed. This is one of the most important things that we can consider. The sooner the operation is performed, the better are the chances of the patient. The cases in which the time is reported number forty-five. The average time after the injury for which operation was done, was eighteen and a half hours. Deducting four cases where more than two days had elapsed, the average falls to twelve and a half hours, while a deduction of all the cases where the time was over twenty-four hours, brings the figures to nine and a half hours. The average time after the injury when the operation was begun in the successful cases was seven and three-quarters hours; the average in the fatal cases was twenty-three and one-quarter hours. These are significant facts. In the five cases operated on at the Pennsylvania Hospital, the average time was six hours. Deducting one case in which from unavoidable circumstances twenty hours elapsed, the average comes down to three hours.

In all cases the question of drainage will arise. It is always diffi-

cult to decide, in any given case, whether drainage should be employed or not. If there have been extravasation and numerous wounds, drainage seems to be indicated. Glass and rubber tubes have been used with apparently equal success and failure. I think that tubes of glass or other hard material are to be preferred. Where there has been extravasation of the contents of the stomach or intestine, this is usually followed by great oozing of serum.

The final steps of the operation are irrigation and cleansing. In irrigation I believe most thoroughly. It should be very large in quantity and can hardly be too much so. If the patient is suffering from shock, there is no better treatment than pouring hot water through the abdominal cavity. It probably acts directly upon the solar plexus. I have seen this frequently used with marked benefit. The patient will be in far better condition after the use of a gallon or more of water at a temperature of 100° to 110° , than before its application. It has occurred to me that in profound shock from other causes, it might be well to puncture the abdomen with some form of double canula and thus irrigate the abdominal cavity with large quantities of hot water. What shall be put in the solution used for irrigation? Several agents have been so used: Water, distilled water, boracic acid solution, mild solution of bichloride of mercury, and solution of carbolic acid. Carbolic acid should be expunged from the list. Bichloride of mercury, when employed, should be in very dilute solution—1 to 5000 or 10,000. Boracic acid was used in two successful cases in three per cent. solution in unlimited quantities. In four cases at the Pennsylvania Hospital the bichloride solution in the strength of 1 to 5000 and 1 to 10,000 was used and apparently without any bad effect. It was used in both of the successful cases there. Distilled water is very good and especially in cases where extravasation has not occurred. Where there has been extravasation, purulent peritonitis set up, or it is not certain that all foreign matters have been removed, I think that an antiseptic is indicated. Where we have a solution like that of boracic acid, possessing fair strength with little danger of poisoning, it should be used. The parietal wound is closed and dressed in the usual manner.

One question in the after-treatment would arise in cases where a drainage tube had not been left, and would be with reference to reopening the wound and draining where a large amount of serum was present. Each individual case must be decided for itself. The onset of violent peritonitis would be an indication for reopening the belly, irrigating and draining it.

I wish now to take up a few of the classes of these cases in succession. Those which have been discussed before will not be reconsidered. Rupture of the bladder will be discussed separately. First, with reference to gunshot wounds. The total number of cases recorded is 22. Of these, 5 recovered and 17 died, a mortality of 77 per cent. Of these 22, 18 were done in the United States; 4 recovered and 14 died, a mortality of 77 per cent. The foreign cases were 4 in number, with 1 recovery and 3 deaths, a mortality of 75 per cent. The first recorded case of gunshot wound treated by abdominal section is that of Dr. Kinloch, of North Carolina, in 1881. The first recovery was the case of Kocher, of Switzerland, in 1883. The first American recovery was a case operated on by Dr. Wm. T. Bull, of New York, in 1884. These 22 cases were done by 15 operators—11 American and 4 foreign. In Philadelphia there have been 2 cases of abdominal section for gunshot wound. One was done at the Pennsylvania Hospital two days since by Dr. Thomas G. Morton. In one case of gunshot wound a wound of the intestine was overlooked, with a fatal result. McKellar, of London, reports a case of two wounds of the lower portion of the sigmoid flexure in which it was impossible to introduce stitches. All that he could do was to throw a ligature around the wounds. The patient died, and fecal extravasation was found at the autopsy. It struck me that in this case rectal distention by a colpeurynter might have been of some assistance, lifting the bowel up so that stitches could be inserted, for I understand that the openings were on the anterior wall. Such cases are, however, exceedingly difficult to remedy.

I will read the notes of a case of gunshot wound of the abdomen:

CASE I.—B. B., a negro, aged thirty-six, of splendid frame and constitution, was admitted late in the afternoon of January 23. Three-quarters of an hour before admission, he had been shot by a ball fired not more than a couple of feet from him; its calibre was 32. When admitted, he was not shocked; but slight nausea and severe general abdominal pain were present. Pulse and respiration slightly accelerated; temperature 98°. A bullet wound was found an inch and a half above and half an inch to right of the umbilicus. No tympany, emphysema, decrease of liver dulness, or other marked symptoms, were present until just before anæsthesia was begun. He then vomited more or less altered blood copiously. Abdominal section had been decided upon by Dr. T. G. Morton over the telephone, and full preparations having been made meanwhile, the operation was commenced almost immediately upon his arrival—an hour and a half after the accident.

The man's condition at that time was very good. The belly wall having been made surgically clean, and penetration proved, an incision was made by Dr. Morton from two inches below the ensiform cartilage to the pubes. In-

stantly upon opening the peritoneum a large quantity of fluid and clotted blood, together with much flatus and partially digested food and feces, gushed forth. The peritoneum, where not injured, looked in good condition. The cavity was first cleaned as well as possible by rapid sponging, and then searched for wounds. Three perforating wounds of the stomach first came into view. They were situated in a straight line, transverse, just above the omental attachment, and rather to the left of the centre of the organ. Two were anterior; the third posterior, and came out through the omental attachment. One other perforation of the stomach was found. This was in the lower edge of the right-hand portion, about three inches from the pylorus. All of these holes were bleeding pretty freely, and vomiting gastric contents. The posterior perforation was found only after several careful searches. Next, a linear rent of the transverse colon, just before it curves downward, was found. The tear was an inch and a half or two inches long, and through the omental attachment. All of these wounds were trimmed and sutured with Lembert sutures, of fine chromicized catgut, about an eighth of an inch apart.

The omentum was terribly torn in a number of places, and filled with very large extravasations of blood, which had become clotted. The clots were removed as thoroughly as possible, and one long rent corresponding to the colon wound was stitched by a continuous suture. A number of ecchymoses of the small intestine and mesentery were found; one of these ecchymoses of the intestine looked as if it would be likely to slough. This was turned in by uniting the serous surfaces of the bowel above it with the Lembert suture. The entire cavity was thoroughly searched, including the liver, gall-bladder, and spleen. The bullet could not be traced after leaving the stomach. The spinal and dorsal regions had been carefully examined for evidence of it there before the operation was begun.

Every portion of the abdominal cavity was then sponged and thoroughly irrigated with HgCl_2 solution, 1 to 10,000, and the parietal wound closed without leaving in a drain, and dressed in the usual manner of the hospital. Time from patient's being taken from bed until put back again, two hours. Time from beginning incision to putting on dressing, an hour and a half.

After the operation the patient was somewhat shocked, but in an hour had reacted well, and was perfectly rational. He remained in this condition for four hours, complaining only of slight pain in abdomen. Five hours after operation he presented all the signs of hemorrhage, and rapidly sank; breathing much interfered with, and no radial pulse. He died in another hour—six hours from the completion of the operation.

Post-mortem.—Abdominal cavity contained about a pint of faintly blood-tinged serum; intestines congested; no additional or overlooked wounds found; the repaired ones in good condition and water-tight. Ball, after leaving stomach, penetrated diaphragm, and, without injuring the lung, struck the lower border of the seventh rib three inches anterior to its angle, chipping it and cutting the intercostal artery, which had bled a pint and a half into the pleural sac. The ball was found an inch and a half further along anteriorly in the same interspace.

The only point that I would add is in reference to finding the ball. As a rule, it is not found. In this case we traced it as far back as

the diaphragm, and thought that it might have gone through the edge of the spleen, but examination showed no wound of the spleen. The difficulty experienced in finding wounds of the upper portion of the stomach, where the omentum is cut and ecchymosed, is almost beyond description. It is a wonder that some of the wounds were not overlooked.

The next table to which I shall refer is that of stab wounds. In all the cases, with the exception of one, the wound was produced by a knife. In that one instance it was caused by a sharp splinter of wood. As we should expect, this table presents the most favorable showing. The total number of cases reported is 19. Of these, 12 recovered, and 7 died; a mortality of 36 per cent. These operations were done by 14 operators: 10 American and 4 foreign. The 10 American operators did 15 operations, with 8 recoveries, and 7 deaths. The foreign operators did 4 operations, and all recovered. The first case on record is that of Kwiecinski, of Russia, April 15, 1883. The first American one is that of Dr. W. O. Roberts, operated on August 28, 1885. The first recovery was the case of Kwiecinski. The first American recovery was the case of Dr. Roberts. The credit of the first recovery properly belongs to Dr. Roberts, of the United States, for the Russian operator had a large wound already made, which he enlarged to a certain extent, and sought for the intestinal wounds. Dr. Roberts had but the small opening made by a penknife.

I shall now read the histories of two cases:

CASE II.—G. W. J., aged forty, a powerfully built man, was admitted to the Pennsylvania Hospital, September 9, 1886, at 10.30 P. M. He had been stabbed by a long and narrow butcher's knife a few minutes previously, and had lost considerable blood. Had frightful pain in right side of abdomen; scarcely any shock. Upon examination a wound three-quarters of an inch long was found about two inches above the centre of Poupart's ligament on the right side; through it were prolapsed several inches of small intestine. Dr. John B. Roberts saw him in about three-quarters of an hour, and determined upon abdominal section. The operation was begun at once by making a five-inch median incision, strict antiseptic precautions being adhered to. The peritoneal cavity contained a large amount of dark fluid and clotted blood, while the intestines were almost wholly collapsed and empty. The prolapsed bowel was first reduced and then brought out through the operation wound and carefully examined, cleansed, and returned. The entire intestinal canal was thus examined, as were also the other viscera and mesentery.

This research revealed six wounds of the intestine and mesentery: namely, four wounds opening small intestine, one cut opening the colon just above the cæcum and running into the mesocolon, one transfixion of the mesentery. The wounds of the colon and mesentery were bleeding actively—the former permitted escape of bowel contents. The lesions of the small intestine were

occluded by prolapsed mucous membrane. All open wounds were about one-half inch in extent, and were closed with Lembert's sutures of silk. After repairing these injuries the abdominal cavity was thoroughly irrigated with hot 1:10,000 HgCl₂ solution, and then sponged dry. A glass drain-tube was put in as far as the rectovesical pouch, and the parietal wound closed with chromicized catgut. He reacted well, and was perfectly comfortable next day after the drain had been removed, for it caused great pain in the lower pelvic region. Previous to its removal, about six ounces of faintly blood-tinged serum came through it. No pain afterward. Its exit was stitched.

No food was given for three days, but bromide of potash, chloral, and brandy were administered in large doses, as delirium tremens was anticipated. Nourishment was begun on the fourth day, and gradually increased. Delirium then present, and on the increase. On the fifth day he seemed in a fair way to die from the great exhaustion incident to the mania. With Dr. Roberts's consent I determined to give strychnia to physiological effect—regarding that drug as indicated in the profound nerve exhaustion of delirium tremens. One-thirtieth of a grain twice daily by hypodermic was started, and the quantity rapidly run up until twitching, etc., became manifest. This did not occur until he had been taking one-tenth of a grain every hour, and a half for half a day. The same dosage was kept up for thirty-six hours and then reduced to one-tenth of a grain every fourth hour for another day, as that amount kept up the full effect, since he was becoming more and more sensitive to its influence.

He was thus kept, by smaller and smaller doses, in the full physiological effect of the drug for nine days; at the end of which time ten minims of tr. nux vom. could not be comfortably borne, and the drug was suspended entirely.

The effect upon him of this medicament was very marked indeed, and both Dr. Roberts and myself firmly believe that it saved his life. I have since tried this treatment upon similar cases with exceedingly good result.

Beyond the above his convalescence was uneventful. The belly healed by primary union. He was walking about his room on the fifteenth day, and in the yard on the seventeenth.

Discharged on the nineteenth day.

CASE III.—J. D., an Italian fruit-vender, aged thirty, was brought to the hospital at 1 A. M., December 25, 1886. He had received a stab during a broil some squares distant from the institution, and had walked all the way. Almost immediately upon receipt of the injury he vomited the contents of his stomach; not much pain was present, and that little was just around the wound, which was situate two inches to right, and three-quarters of an inch above umbilicus. *Decided emphysema was present* for a space of three inches all around the wound. Temperature, pulse, and respiration were normal. He was given a dose of morphia by hypodermic, and slept quietly until morning. There was no odor about wound, no signs of fluid in peritoneal cavity, nor diminution of liver dulness. At that time, 1 A. M., the wound, one-half an inch long, was cleansed, stitched, and sealed with benzine and collodion.

At 7 A. M., pulse, temperature, and respiration still normal, but much pain

was complained of, which seemed centred about the region of the wound, and was stated to be increasing and spreading every moment. Vomited green material.

It was decided to do an abdominal section, and at 10.30 A. M. the operation was commenced by Dr. T. G. Morton.

The original wound was first proved to penetrate—the intra-abdominal opening was not more than one-quarter of an inch long. Median incision was then done from two inches above umbilicus to within one inch of pubes, and the abdominal contents searched. A small amount of fluid and clotted blood (5ss) was found immediately beneath the stab wound. This blood was mainly entangled in the omental tissues. A rent of one layer of the omentum, about two inches long, was found in this region, also a divided and bleeding omental vessel just outside of the tear. The artery was ligated, and the tear sewn with catgut. The peritoneal opening of the stab wound was then closed by a single stitch of the same material. No other lesions could be found, as the cavity was carefully cleansed with sponges, and plentiful irrigation with warm 1:10,000 HgCl₂ solution, and the external wounds closed with closely placed interrupted fourteen-day catgut sutures. An antiseptic dressing and flannel bandages were applied, and morphia to mild narcotization administered. No drain was used. Strict antisepsis prevailed throughout. Time of operation, one and a half hours.

December 29th. The only annoying symptom from which he has suffered has been bilious vomiting from time to time, and which still keeps up in spite of various medicaments and champagnes, of which latter he has been taking f3j every second hour; also has been taking f3j of peptonized milk every two or three hours since 12.27 A. M. Dressed, because of disordered dressing yesterday, and wounds found united throughout.

Bowels opened last night, and again this morning, by enema. Urine had to be drawn twice following operation. Has had no special pain.

January 11, 1887. Up to-day and walking about. All sutures are away. No dressing on wound since January 8.

January 21st. Discharged cured; walked home; twenty-eight days in hospital.

The next table to which I shall refer is that of ruptured bladder, which has been to me, perhaps, the most interesting of the series. The total number of cases reported is 10, with 4 recoveries and 6 deaths, a mortality of 60 per cent. There were 9 operators—3 American and 6 foreign. The American operators performed 3 operations, with 1 recovery and 2 deaths. The foreign operators performed 7 operations, with 3 recoveries and 4 deaths. The first recorded case of abdominal section for ruptured bladder is that of Walters, of Pittsburg, in 1862. This case was also the first recovery. In Walters's case he diagnosed rupture of the bladder, with infiltration of the peritoneum with blood and urine. He opened the abdomen, cleaned it out, and put in a drainage tube, but did not sew the bladder wound. The second case was that of Alfred Willits, of London, operated on June 12, 1876.

This case died. The second American case was that of Dr. Bull, operated on October 27, 1884. This case also died. Two recoveries have recently been reported by MacCormac. Philadelphia has had one case, which was operated on by Dr. Joseph M. Fox, August 16, 1886, with fatal issue. I will read the report of this case:

CASE IV.—E. M., a man aged thirty-eight, at one A. M. on August 16, 1886, walked out of a second-story window. Two and a half hours afterward he was admitted to the Pennsylvania Hospital. He had been drinking much the previous evening, and the bladder was distended at the time of accident. Upon examination, the resident surgeon, Dr. Alexander McAllister, found that the neck of one femur was fractured, and that he had marked symptoms of ruptured bladder, namely, great pain over bladder and lower abdominal region; intense desire, but no power, to micturate; bloody urine by catheter. He was much shocked, but had recovered by nine A. M., when he was in good condition. Dr. Fox at that time saw him, confirmed the diagnosis, and determined to operate, but through the intervention of circumstances beyond his control was prevented from so doing until evening, when the operation was performed.

Strict antisepsis prevailed. A four-inch median incision was made over the bladder. Ten ounces of blood and urine were found in the peritoneal cavity. Intestines congested, and in places looked almost gangrenous. A two and a half inch triangular opening was found in the anterior portion of the fundus. The viscus was held up by two long sutures passed through the sides of the rent, and the wound was then sewed with closely placed Lembert sutures of catgut; fifteen were introduced. It did not leak when distended with 1:1000 HgCl₂ solution. The abdominal cavity was then thoroughly washed with 1:5000 solution, and the parietal wound closed, leaving in a bone drain-tube down to the bladder; but, of course, not entering that organ. A rubber catheter was left in the urethra. He died in forty-two hours.

Post-mortem examination showed localized peritonitis about wounds. Wound of bladder water-tight. Blood clots in pelvic basin.

Now a few details with reference to ruptured bladder. The symptoms of ruptured bladder are more definite than those of most other cases. The condition of the bladder at the time when the injury is received is of some importance, but cannot always be ascertained. Shock is usually present, as in other cases. Pain in the hypogastrium, fruitless efforts at micturition, vomiting, hiccough, distention of the abdomen with fluid, the withdrawal of blood or bloody urine by the catheter, are all good indications. If there is no urine in the bladder, or none comes in, it is a fair sign. The catheter can sometimes be introduced to a great length, and occasionally the rent in the bladder wall may by this means be detected. The withdrawal of an enormous quantity of fluid is another indication. If warm water is injected, it may be felt by the patient in the loins and other locations. With the

eatheter in the bladder, the liquid sometimes ebbs up and down with the movements of respiration. Recently Dr. Weir, of New York, has suggested a test for ruptured bladder, which consists in injecting a certain amount of fluid and percussing over the region of the bladder. If a definite outline of percussion dulness is noted, it is a fair inference that the bladder is not ruptured.

It is important to determine whether the rupture is extra- or intraperitoneal. Stephen Smith has shown, in a collection of 65 cases, that the peritoneum is injured in 80 per cent. of the cases. Max Bartles found, in an examination of 166 cases, that the rent was intraperitoneal in 98, and extraperitoneal in 54. In 84 cases of intraperitoneal rupture the rent was situated at the fundus in 40 cases; in front, near the fundus, in 9; posteriorly in 33; and at the side in 2 cases. In 50 cases of extraperitoneal rupture, the rent was at the neck in 19, anterior in 23, posterior in 2, and at the side in 6. In 15 of these cases there was fracture of the pelvis. In these cases, as a rule, the urine found in the peritoneum is healthy, and not decomposing. An interesting paper has been published by a Russian, giving the toxic effects of urine which has escaped into the peritoneal cavity.

The method of operating is an interesting one. Having determined upon interference by section whether the diagnosis has been made positive or not, a median incision should be made and enlarged to suit the convenience of the operator. The incision may at first be made down to the bladder, as for a suprapubic lithotomy. If there is a wound in front, you may feel it if it enters the peritoneal cavity; but even this is fallacious. Having found the wound in the bladder, the first thing is to clean the peritoneal cavity. Next, it is necessary to get the bladder into a position to suture it. This has been, until recently, found one of the most difficult steps of the operation. To obviate this, distention of the rectum with a colpeurynter has been practised. More recently, as in the case of Fox, sutures have been introduced on either side, and may be combined with the use of the colpeurynter. MacCormac, who found considerable difficulty in bringing up the bladder, made a lateral incision on each side through the peritoneum. This liberated the bladder immensely. These peritoneal wounds he stitched together in the usual way, but it appears to me that this might be improved upon by introducing the stitches as Dr. Emmet does when sewing up his relaxation incisions of the vagina or elsewhere—that is, by uniting the wound by stitches passed in its longitudinal diameter. It has been found that the cases in which the

sutures penetrate all the coats of the bladder invariably terminate fatally. This must be borne in mind, and the sutures passed through only the serous and muscular coats. The bladder wound is to be brought together with Lembert sutures of silk or catgut.

The after-treatment brings up the question of drainage, which has been discussed. A catheter should be left in the bladder. Another important thing is to prove that the stitches effectually control the opening in the bladder. This is done by injecting some solution—better, a weak antiseptic solution—into the bladder. If there is any leakage, additional sutures should be introduced; or the first row of stitches, by a second set, turned in.

The last division of the paper relates to rupture of the intestine. The total number of cases reported is five, of which number none recovered. One operation was performed in America and four abroad—two in Australia, one in France, and one in England. The first recorded case is that of F. H. Girdlestone, of Australia, February 14, 1883. The only American case recorded is that of Dr. E. A. Wagner, on August 2, 1886. One case fell, and pressed a truss down upon a descended hernia; one was thrown from a horse; two were kicked in the abdomen; and one was crushed by a horse. In five cases the small intestine was ruptured, and in one the colon was the part involved. I have the notes of one case of ruptured intestine which occurred in my father's wards in the Pennsylvania Hospital. I wish, in conclusion, to relate it, although it was not an operative case.

CASE V.—B. R., aged fifty-seven, was brought to the Pennsylvania Hospital, a distance of ten miles, on a bitter cold night, sitting in an upright position. Upon his arrival he was in a state of collapse, from exposure, cold, pain, and weakness. He stated that he had long been subject to a hernia (indirect inguinal) of the right side; that he habitually wore a truss that did not keep it reduced properly; and that while it was down, about thirty hours before admission, he had been violently kicked in that groin. He experienced some pain and nausea at the time, and both steadily increased up to the time of his admission. His bowels had not moved.

Upon admission his condition was as above; no vomiting or belly pain. A large swelling was present along the proper position of an indirect inguinal hernia. In this lump he had severe pain. All endeavors were directed to bringing him out of his shocked condition.

Dec. 3, 1886. Late last night he had reacted sufficiently to receive an anæsthetic, which was administered, and a thorough examination of the affected region made. No hernia was present; simply a mass of inflammatory exudation. Considerable emesis and some recurrence of shock followed. This morning his condition seemed fair. He stated that he had none or very little pain; took liquid nourishment; and had his bowels freely moved by enema; *no abdominal symptoms whatever.*

In the afternoon he vomited, several times, material with a suspicion of fecal odor about it, and during the night it became very markedly so. It now became evident that he was suffering from one of three conditions, namely, either a ruptured gut, a reduced though still strangulated hernia, or an intussusception.

4th. The first thing this morning preparations were made for opening the scrotum, and, if necessary, the abdomen; but the anæsthetic so depressed him, and his condition within the last few hours had become so bad, that the operation had to be abandoned. He died in the course of a couple of hours.

Post-mortem.—Upon incising the scrotum a quantity of fecal material was found; no hernia was present, but the internal ring was patulous. The peritoneum was found in a state of general peritoneal inflammation, and a great quantity of fecal fluid material was present in the pelvic basin. A loop of small intestine, having an inflammatory ring about its neck, was found in a state of almost gangrene, from congestion and inflammation; while the loop was torn for an inch in extent in two places; the communication of the loop at both ends with the normal bowel was present, though the opening was small. Post-mortem examination otherwise negative.